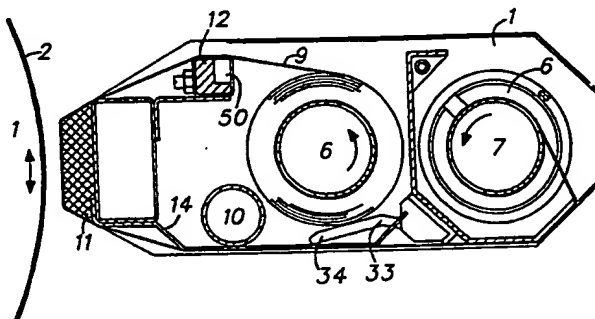




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(54) Title: METHOD AND APPARATUS FOR AUTOMATICALLY CLEANING ROLLERS, PARTICULARLY BLANKET CYLINDERS AND COUNTER-PRESSURE CYLINDERS		

**(57) Abstract**

An apparatus (3) and a method for automatically cleaning rollers, and in particular impression cylinders (1) provided with blankets (2), or counter-pressure cylinders. The apparatus (3) includes a reeling-off roller (6) and a reeling-on roller (7). The roller (6) carries a cleaning web (9) which extends from the roller (6) over a pressure pad (11) attached to a holder (14) and from there to the reeling-on roller (7), optionally via one or more guide rolls (10). Positioned between the reeling-off roller (6) and the pressure pad (11) is a spray device (12) which delivers cleaning agent (13) to the web. The holder (14) is attached to a compressed-air piston (15) which is able to move the holder (14) backwards and forwards, towards and away from the impression cylinder (1). During this reciprocating movement, the cleaning web (9) is moved progressively from the reeling-on roller (6), over the pressure pad (11) and to the reeling-on roller (7).

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METHOD AND APPARATUS FOR AUTOMATICALLY CLEANING
ROLLERS, PARTICULARLY BLANKET CYLINDERS
AND COUNTER-PRESSURE CYLINDERS

5 The present invention relates to apparatus and to a method for automatically cleaning rollers, particularly blanket cylinders and counter-pressure cylinders in printing machines.

10 In a conventional printing press, the paper web to be printed is taken from a feed roller and passed through the actual printing press, which comprises one or more printing or impression cylinders, where the paper to be printed is printed on one or both sides thereof and
15 which paper, when printing is completed, passes over one or more guide rollers to a folding device, where the printed paper web is cut and folded. The blanket cylinders are normally clothed with a rubber material or some other polymeric material. The two long sides of the
20 blanket material are normally secured in a groove which extends in the longitudinal direction of respective impression cylinders.

25 The printed paper deposits ink and paper fibres (lint) on the blanket, successively as printing continues. These ink and paper-fibre deposits must be removed from the blanket at regular intervals in order a) to prevent pleating or wrinkling of the paper web, b) to prevent the deposits from transferring to the paper web, and c)
30 to prevent faulty web-registration or alignment of the web with the impression cylinders, and impaired quality of the print produced. When cleaning such blankets, it is necessary to take into account the fact that the longitudinal attachment groove extends along the cylindrical surface of the blanket. Many different methods of
35 cleaning impression cylinders manually are known to the

art. For instance, the deposits can be removed by scraping clean the press cylinders, subsequent to having removed the paper web, either with or without the addition of a cleaning agent. This cleaning method is laborious, slow and highly expensive.

The object of the present invention is to provide an apparatus and a method for cleaning the blankets of impression cylinders which will avoid the aforesaid problems and which will enable blanket cylinders to be cleaned several times more quickly, more positively and more effectively than can be achieved with hitherto known manually-operated apparatus and methods.

The invention will now be described in more detail with reference to non-limiting and solely exemplifying embodiments thereof, and with reference to Figures 1-19 of the accompanying drawings.

Figure 1 illustrates schematically and in perspective an impression cylinder 1 fitted with a blanket 2 and provided with a groove 2B by means of which the blanket is secured to the cylinder 1, and an apparatus 3 for automatically cleaning the blanket in accordance with a first embodiment of the present application.

Figure 2 is a side view of the cleaning apparatus 3.

Figure 3 is a top view, partly in section, of the cleaning apparatus 3, shown in Figure 1.

Figure 4 is a sectioned side view of the cleaning apparatus 3 and shows the apparatus in a rearward or retracted position in which the reeling-off roller 6 is almost fully wound with cleaning material 9.

Figure 5 is a sectioned side view of the cleaning apparatus 3 and shows the apparatus in a forward position in which the reeling-off roller is almost empty of cleaning material 9.

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Figure 6 is a side, section view of a first embodiment of the pressure pad 11 and its holder 14. In this case, the holder 14 is configured such that when viewed in section the holder consists of a beam or bar of generally rectangular cross-section. The pressure pad 11 has a uniform thickness and is fastened to the holder 14 over the whole of its surface.

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Figure 7 is a side view in section of a second embodiment of the pressure pad 11 and its holder 14. This holder 14 also has the form of a beam or bar of generally rectangular cross-section. The beam has attached thereto two spacer elements each of which presents two narrow, elongated raised portions. In this case, the pressure pad 14 comprises a cloth of uniform thickness which is stretched over the raised portions.

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Figure 8 is a side view in section of a third embodiment of the pressure pad 11 and its holder 14. This embodiment is similar to the embodiment illustrated in Figure 6, but with the difference that the pressure pad 11 in this case comprises a cloth of uniform thickness.

25

Figure 9 is a side view in section of a fourth embodiment of the pressure pad 11 and its holder 14. In this case that part of the holder 14 which faces towards the cylinder 1 comprises a flat surface to which the pressure pad 11 is secured. That surface of the pressure pad 11 which faces the cylinder 1 is preshaped in a manner to present substantially the same radius of curvature as the cylinder 1.

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Figure 10 is a side view in section of a fifth embodiment of the pressure pad 11 and its holder 14. That part of the holder 14 which faces towards the cylinder 1 also in this case comprises a flat surface to which the pressure pad 11 is secured. The pressure pad 11 comprises a plate of uniform thickness and that part of the plate which faces the roller 1 is bevelled, among other things, to facilitate feeding of the cleaning web 9.

Figures 11-15 illustrate schematically a first drive means 20 which drives the reeling-off roller 6 and a second drive means 21 which drives the reeling-on roller 7, intended for an alternative embodiment of the cleaning apparatus 3.

Figures 16-19 illustrate schematically a first axle lock for the reeling-off cylinder 6, and a second axle lock 43 for the reeling-on roller 7.

As will be seen from the Figures, a first embodiment of the cleaning apparatus comprises one or more side members 5, which may or may not be housed in a housing 4, a reeling-off roller 6 and a reeling-on roller 7 which is driven by a rotatable cylinder 16, wherein the roller 6 and the roller 7 are each provided with a disengagable reverse stop 8A and 8B. In alternative embodiments, the cleaning apparatus 3 has no housing 4.

The cleaning apparatus 3 is constructed so that it can be mounted adjacent an impression cylinder 1 in a desired manner. The cleaning apparatus 3 will function efficiently irrespective of its orientation in space. Wound on the reeling-off roller 6 is a web of cleaning material 9, which may consist of paper, non-woven fabric, felt or some other highly absorbent material. The web 9 runs from the reeling-off roller 6 over a pressure

pad 11 and from there optionally over one or more guide rollers 10, and is finally wound onto the reeling-up roller 7. Only one guide roller 10 is shown in the Figures 4 and 5. Located between the reeling-off roller 6 and the pressure pad 11 is a spray device 12 which is used to spray the cleaning web 9 with a cleaning agent 13. This cleaning agent will preferably have properties which prevent it from weakening the cleaning web to any considerable extent and may, for instance, consist of a mixture of mineral oil fraction, which constitutes a solvent for a number of printing inks, and water, which dissolves paper fibres.

The pressure pad 11 is preferably made of a foamed, closed-cell polymeric material and is fastened to a holder 14. The pressure pad 11 and the holder 14 may have several different configurations, of which five preferred embodiments are disclosed in the above descriptions of Figures 6-10. According to a sixth embodiment, not shown, the holder 14 may have the form of a beam or bar of generally circular cross-section, and the pressure pad 11 has the form of a thin plate, which is attached to the holder. The holder 14 is mounted so that it can either rotate or remain stationary.

According to a first embodiment, the holder 14 is attached to a compressed-air piston 15 which is able to move the holder 14 linearly towards and away from the impression cylinder 1. The reeling-off roller 6 is provided with a disengagable reverse stop 8A, which prevents the reeling-off roller 6 from rotating in the direction in which the cleaning web 9 is reeled-off from the reeling-off roller 6, i.e. an anti-clockwise direction as seen in the Figures. The reeling-on roller 7 is provided with a disengagable reverse stop 8B, which prevents rotation in the direction in which the cleaning

web 9 arrives, i.e. in a clockwise direction in the Figures, and is connected to a compressed-air rotary cylinder 16 (not shown in detail) which functions to rotate the reeling-up roller 7 in a direction opposite to the aforesaid direction, i.e. an anti-clockwise direction as seen in the Figures. Compressed-air delivered to the cylinder 16 passes through a conventional valve 17 (not shown) which is controlled so that the reeling-on roller 7 will be rotated at the correct moment in time, in accordance with the method described herebelow.

As illustrated in Figures 11-15, an alternative embodiment of the inventive cleaning apparatus 3 is characterized in that the apparatus lacks the aforesaid rotary cylinder 16; in that the reeling-off cylinder 6 is driven by a first drive means 20; in that the reeling-on roller 7 is driven by a second drive means 21; in that the drive means 20 and 21 are constructed advantageously so that each of said drive means can drive in solely one direction of rotation and in that the driving function of said means is not dependent on friction between the components of the cleaning apparatus 3; and in that each of the first and the second drive means 20 and 21 include an engagable and disengagable toothed ring 29 which is mounted, by means of a free hub 30, to one end of the reeling-off roller 6 and to one end of the reeling-on roller 7 respectively, said end preferably being opposed to said one end of the reeling-off roller 6 and is caused to rotate in one direction or the other with the aid of a rack 31; and in that respective racks 31 are mesh with their corresponding toothed rings 29 when the cleaning web 9 is not moved forwards or backwards, in a manner such as to generally lock the reeling-off roller 6 and the reeling-on roller 7 against rotation, wherein further tension force in the cleaning web 9 may

result in fracture of the web but will not cause the reeling-off roller 6 and/or the reeling-on roller 7 to begin to rotate.

5 A further exemplifying embodiment of the inventive
cleaning apparatus 3 is characterized in that the reel-
ing-off roller 6 is provided with a first pulse emitter
22 (not shown in detail); in that the reeling-on roller
10 7 is provided with a second pulse emitter 23 (not shown
in detail), wherein both pulse emitters 22 and 23 deliver
a number of pulses which is proportional to the
rotation of respective rollers 6 and 7; in that the
arrangement is provided with means 24 (not shown in
15 detail) for processing said pulses in a manner such as
to enable information to be obtained continuously with
regard to the length of cleaning web 9 that is advanced
on each occasion and with regard to the length of clean-
ing web 9 that remains on the reeling-off roller 6; and
in that the pulse-processing means 24 is constructed to
20 monitor continuously the length, or amount, of paper web
9 that is transferred between the reeling-off roller 6
and the reeling-on roller 7.

As will be seen from the Figures 4 and 5, another alter-
25 native embodiment of the inventive cleaning apparatus 3
is characterized in that the spray device 12 includes a
chamber 50, preferably made of a polymeric material,
which can be expanded by means of compressed-air or
liquid-pressure and which, with the aid of means for
30 controlling the compressed-air or liquid-pressure, is
used to drive out the liquid delivered to the spray
device 12.

As illustrated in Figures 4 and 5, a further alternative
35 embodiment of the inventive cleaning apparatus 3 is
characterized in that one end of the reeling-off roller

6 is provided with a number of recesses or notches 32 (not shown in detail) and that mounted on this end of the roller 6 is a spring-loaded rotation-blocking device 34 which is provided with an end-hook 33. The device 34
5 slides against the web 9 wound on the reeling-off roller 6 and a small length of that end of the web 9 which lies nearest the roller 6 is cut obliquely, above the region of the rotation-blocking device 34, so that the width of
10 said web will not extend beyond said device 34, wherein the device 34 will come into engagement with the outer, bare surface of the roller 6 immediately the obliquely cut end of the web begins to pass the device 34, whereupon the end-hook 33 engages in the recesses or notches 32 in a manner to lock the reeling-off roller 6 against
15 rotation.

As will be seen from Figures 16-19, a further alternative embodiment of the inventive cleaning apparatus 3 is characterized by a first axle lock 35 which functions to
20 lock the axle of the reeling-off roller 6 and which has the following construction:

- one end of the reeling-off roller 6 has the form of a rectangular shoulder 36 of generally uniform thickness;
25
- the side member 5 against which the aforesaid end of the reeling-off roller 6 is intended to lie is provided with a shaft 44 whose end which faces the roller 6 is provided with a flange 45 around which there is mounted
30 a rotatable locking ring 37 which is provided with a groove 38 corresponding to the shoulder 36 and the twisting of which in the direction of rotation is limited by a stop screw 39;
- 35 - extending through the locking ring 37 is a journalled locking pin 40 which is biased by a spring means 41 so

as to strive to move in a direction towards the centre of the locking ring 37, from an outer position to an inner position, wherein the locking pin 40 is constructed and fitted so that the pin is moved to its inner position by the spring means 41 when, and only when, the shoulder 36 is correctly inserted in the groove 38, and which pin otherwise remains in its outer position, and wherein movement of the locking ring 37 in the rotational direction is restricted due to the inability of the locking pin 40 to pass a stop abutment 42; and

- the axle lock 35 is therewith so constructed that when an attempt is made to rotate the reeling-off roller 6 with the locking pin 40 located in its outer position, the locking pin 40 is moved into engagement with the stop abutment 42 so as to obstruct said rotation, wherein the pulse-processing means 24 is unable to deliver acceptable signals which would result in continued operation of the arrangement, and wherein the arrangement is provided with a second axle lock 43 for locking the reeling-on roller 7, the construction being the same as the construction of the first axle lock 35.

Another alternative embodiment of the inventive cleaning apparatus 3 is characterized in that the flange 45 has a profiled surface section 37 (not shown in detail), for instance a corrugated or serrated surface, and in that the arrangement is provided, preferably on the side members 5, with safety pins 25 which coact with springs 26, the arrangement being such that

- respective springs 26 strive to move the safety pin 25 towards said profiled surface section 27;
- when the arrangement is running smoothly, respective springs 26 are held with the aid of compressed-air in a position such as to prevent the safety pin 25 from lying against the profiled surface section 27;

- when the delivery of compressed-air stops, in accordance with the foregoing, the spring 26 moves the safety pin 25 into engagement with the profiled surface section 27;
- 5 - compressed-air is delivered via an active valve 28 which requires a continuous input signal in order to be held open;
- when this input signal is interrupted, the delivery of compressed-air also ceases, in addition to such
- 10 stoppages being caused by disturbances in the compressed-air delivery system; and such that
- said input signal is generated by the pulse-processing means 24 when, and only when, said pulse-processing means 24 fails to detect faulty running of the arrange-
- 15 ment.

Another alternative embodiment of the inventive cleaning apparatus 3 is characterized in that the housing 4 and/or the side members 5 are constructed so as to form

20 parts of means connected thereto.

Since the cleaning web 9 can be produced with such quality as to enable the deposits and paper fibres absorbed by the web to be removed therefrom while retaining the cleaning efficiency of the web to a large

25 extent, the inventive apparatus may include a web-degreasing bath 19. Although not shown in detail, the bath 19 can be placed at various positions in the apparatus, preferably between the pressure pad 11 and the

30 reeling-up roller 7, so that the web 9 will subsequently pass through the bath 19.

When a blanket 2 applied to the impression cylinder 1 needs to be cleaned, the first mentioned embodiment of

35 the inventive cleaning apparatus 3 is used in accordance with the following method steps:

1) The rear surface of the cleaning web 9 is sprayed with cleaning agent 13, by means of the spray device 12, over that length of web which is located between the reeling-off roller 6 and the pressure pad 11. The cleaning agent 13 will then quickly penetrate the web 9.

2) The holder 14 is held pressed forwards from its rearward position, with the aid of the piston 15. Part of the web 9 is then unwound from the reeling-off roller 6, the length of this web-part being equal to the length of the working stroke of the piston 15.

3) The piston 15 is then retracted, wherewith the holder 14 returns to its rearward position. The rotational cylinder 16 is activated during this return movement to rotate the reeling-on roller 7 in an anti-clockwise direction. That part of the web 9 which has been saturated with cleaning agent 13 is therewith drawn forwards over the pressure pad 11.

4) The holder 14 is again pressed forwards from its rearward position, with the aid of the piston 15, so that the pad 11 is pressed against the blanket 2 while the impression cylinder 1 continues to rotate. The saturated cleaning web 9 therewith removes deposits and fibres from the blanket 2. Step 1) may be repeated during some part of this cleaning step, i.e. the surface of the cleaning web may again be sprayed with cleaning agent 13 by the spray device 12, over that web-part which is located between the reeling-off roller 6 and the pressure pad 11. Cleaning of the blanket during step 4) can thus be achieved with a dry cleaning web 9 or with a web that has been sprayed with cleaning agent.

5) Step 3) is repeated, i.e. the piston 15 is retracted and the holder 14 therewith returned to its rearward

position. During this return movement, the rotational cylinder 16 is activated to rotate the reeling-on roller 7 anti-clockwise. As a result, that part of the web 9 which has been wetted with cleaning agent is drawn over the pressure pad 11 while, at the same time, the soiled part of the web 9 is drawn away from the pressure pad 11 and later reeled onto the reeling-on roller 7.

6) Steps 4) and 5) are repeated as often as is required in order for the blanket 2 to be cleaned satisfactorily.

If the blanket 2 is cleaned relatively shortly after a preceding blanket cleaning operation, that part of the cleaning web 9 which is located on the pressure pad 11 will already have been wetted with active cleaning agent 13 and, consequently, only steps 4), 5) and 6) need be carried out.

If the cleaning web 9 used to clean the blanket is not unduly dirty and thus can be reused, such relatively unsoiled parts of the cleaning web 9 can be rewound onto the reeling-off roller 6, prior to carrying out step 1).

When the cleaning apparatus 3 of alternative embodiments is not provided with a rotational cylinder 16 but, instead, has first and second drive means 20 and 21 respectively, the blanket cleaning operation will include the following steps:

1) The rear side of the cleaning web 9 is sprayed with cleaning agent 13 by the spray device 12 over that part of the web which is located between the reeling-off roller 6 and the pressure pad 11, this cleaning agent 13 quickly penetrating into the cleaning web 9;

2) the reeling-on roller 7 is rotated with the aid of

the second drive means, so as to feed the cleaning web 9 over the pressure pad 11;

3) the holder 14 is urged forwards from its rearward position, with the aid of the piston 15 so as to place the cleaning web 9 against the slowly rotating impression cylinder 1 and therewith cleanse the blanket 2 from deposits and fibres;

4) the piston 15 is retracted, therewith causing the holder 14 to return to its rearward position;

5) when the used part of the cleaning web 9 is heavily soiled, the web is moved in a direction towards the reeling-on roller 7 with the aid of the second drive means 21. If the used part of the cleaning web 9 is only lightly soiled, the web is moved towards the reeling-off roller 6 with the aid of the first drive means 20, so that this part of the web can be reused; and

6) the blanket-cleaning process is continued until the blanket 2 is satisfactorily cleaned, either by moist or wet cleaning of the blanket, i.e. by repeating steps 1)-5) above, or by dry-cleaning the blanket, i.e. by repeating steps 2)-5) above, or by alternating between moist cleaning and dry cleaning of the blanket.

The inventive apparatus and the inventive method can also be applied for cleaning counter-pressure cylinders, i.e. large cylinders which are not blanketed, such cylinders being used in satellite printers and multi-colour printers.

CLAIMS

1. Apparatus for automatically cleaning a roller,
particularly an impression cylinder (1) fitted with a
5 blanket (2) which is preferably secured to the cylinder
(1) with the aid of a blanket attachment groove (2B), or
a counter-pressure cylinder, said apparatus optionally
comprising a housing (4) and one or more side members
(5), wherein the apparatus includes a reeling-off roller
10 (6) having a cleaning web (9) wound thereon, said web
preferably consisting of paper, non-woven fabric, felt
or corresponding material having a high absorption
capacity, a reeling-on roller (7) for reeling-on the
cleaning web (9), a pressure pad (11) over which the
15 cleaning web (9) passes and is pressed intermittently
thereagainst, and a spray device (12) which is posi-
tioned between the reeling-off roller (6) and the pres-
sure pad (11) and which forms a web support and slide
surface, c h a r a c t e r i z e d in that the appa-
20 ratus can be mounted adjacent the cylinder to be cleaned
in any desired orientation in space while retaining
total efficiency in operation; in that the pressure pad
(11) is attached to a holder (14) which, in turn, is
attached to a piston (15), preferably a compressed-air
25 driven piston, which enables the pressure pad (11) and
part of the web (9) lying on said pad to be moved reci-
procatingly generally along a geometric normal to the
mantle surface of the cylinder, wherein the pressure pad
and said web-part can be moved in one direction to an
30 extent such that said web-part is pressed against the
cylinder or against a blanket (2) fitted thereon.

2. Apparatus for automatically cleaning a roller in
accordance with the preceding Claim, c h a r a c -
35 t e r i z e d in that the pressure pad (11) is made of

an elastic material, preferably a closed-cell foamed polymeric material.

5 3. Apparatus for automatically cleaning a roller in accordance with any one of Claims 1-2, c h a r a c - t e r i z e d in that the holder (14) has the form of a beam of generally rectangular cross-section; and in that the pressure pad (11) has the form of a slab of uniform thickness which is attached to the pressure pad (11).

10

4. Apparatus for automatically cleaning a roller in accordance with any one of Claims 1-2, c h a r a c - t e r i z e d in that the holder (14) has the form of a beam of generally rectangular cross-section which has
15 attached thereto a spacer element having two narrow, elongated raised portions over which the pressure pad (11) is stretched, said pad having the form of a cloth of uniform thickness.

20

5. Apparatus for automatically cleaning a roller in accordance with any one of Claims 1-2, c h a r a c - t e r i z e d in that the holder (14) has the form of a beam of generally rectangular cross-section having attached thereto a pressure pad (11) in the form of a
25 cloth of uniform thickness.

30

6. Apparatus for automatically cleaning a roller in accordance with any one of Claims 1-2, c h a r a c - t e r i z e d in that that part of the holder (14) which faces the cylinder (1) is comprised of a flat
30 surface onto which the pressure pad (11) is attached; and in that the surface of the pressure pad (11) which faces towards the cylinder (1) is configured with a radius of curvature substantially equal to that of the
35 cylinder (1).

7. Apparatus for automatically cleaning a roller in accordance with any one of Claims 1-2, c h a r a c - t e r i z e d in that that part of the holder (14) which faces the cylinder (1) consists of a flat surface onto which the pressure pad (11) is attached; and in
5 that the pressure pad is comprised of a plate of uniform thickness, and in that the part of the plate facing towards the cylinder (1) is bevelled.

10 8. Apparatus for automatically cleaning a roller in accordance with any one of Claims 1-2, c h a r a c - t e r i z e d in that the holder (14) has the form of a bar of generally circular cross-section; in that a pressure pad (11) in the form of a thin slab is
15 attached to said bar; and in that the holder (14) is mounted so that it can either rotate or remain stationary.

9. Apparatus for automatically cleaning a roller in
20 accordance with any one of the preceding Claims, c h a r a c t e r i z e d in that the reeling-off roller (6) is provided with a disengagable reverse stop (8A) which will allow the reeling-off roller (6) to rotate in only one direction at a given time; in that
25 the reeling-on roller (7) is provided with a disengagable reverse stop (8B) which will only permit the reeling-on roller (7) to rotate in one direction at a given time; and in that the reeling-on roller (7) is provided with a device for rotation of the reeling-on
30 roller (7), said device preferably having the form of a compressed-air driven rotary cylinder (16) or of a rotational device connected to the piston (15) and driven thereby.

35 10. Apparatus for automatically cleaning a roller in accordance with any one of Claims 1-8, c h a r a c -

t e r i z e d in that the reeling-off roller (6) is driven by a first drive means (21); in that the reeling-on roller (7) is driven by a second drive means (21); in that the first and the second drive means (20, 21) are each constructed to drive in only one direction of rotation and so that the function of said drive means will not be dependent on friction between the apparatus components.

11. Apparatus for automatically cleaning a roller in accordance with Claim 10, c h a r a c t e r i z e d in that each of the first and the second drive means (20, 21) includes an engaging and disengaging toothed ring (29) which is mounted, through the medium of a free hub (30), on one end of the reeling-off roller (6) and the end of the reeling-on roller (7) respectively, said end preferably being opposite said one end of the reeling-off roller (6), and which is caused to rotate in one or the other direction of rotation with the aid of a rack (31); and in that respective racks (31) are in engagement with their respective toothed rings (29) when the cleaning web (9) is not fed forwards or backwards, such that both the reeling-off roller (6) and the reeling-on roller (7) are essentially locked against rotation.

12. Apparatus for automatically cleaning a roller in accordance with any one of the preceding Claims, c h a r a c t e r i z e d in that the reeling-off roller (6) is provided with a first pulse emitter (22); in that the reeling-on roller (7) is provided with a second pulse emitter (23); in that the two pulse emitters (22, 23) are intended to deliver pulses in a number which is proportional to rotation of respective rollers (6, 7); in that the apparatus includes means (24) for processing the pulses in a manner such as to obtain continuously information concerning the extent to which the cleaning

web (9) is advanced on each occasion and concerning the amount of cleaning web (9) that remains on the reeling-off roller (6); and in that the pulse-processing means (24) is constructed to monitor continuously the amount of paper web (9) which is transferred between the reeling-off roller (6) and the reeling-on roller (7).

13. Apparatus for automatically cleaning a roller in accordance with any one of the preceding Claims, characterized in that the spray device (12) includes a chamber (50), preferably constructed from a polymeric material, which can be expanded by means of compressed-air or liquid-pressure and which, with the aid of means functioning to control said compressed-air or said liquid-pressure, is used to drive liquid from the spray device (12).

14. Apparatus for automatically cleaning a roller in accordance with any one of the preceding Claims, characterized in that one end of the reeling-off roller (6) is provided with recesses or notches (32); in that a spring-loaded rotation-blocking device (34) provided with an end-hook (33) is mounted adjacent said one end; in that the rotation-blocking device (34) is intended to slide against the cleaning web (9) wound on the reeling-off roller (6); in that a small length of that part of the cleaning web located nearest the reeling-off roller is cut obliquely above the rotation-blocking device (34) in a manner such that the width of the web will not extend beyond said rotation-blocking device (34); and in that the rotation-blocking device (34) is intended to be brought into engagement with that part of the reeling-off roller (6) that is bared immediately the obliquely cut end of the web begins to pass beyond said rotation-blocking device, therewith to bring the end-hook (33) into engagement with said recesses or

notches (32) in a manner to lock the reeling-off roller (6) against rotation.

15 Apparatus for automatically cleaning a roller in accordance with any one of the preceding Claims, characterized in that the apparatus includes a first axle lock (35) for the reeling-off roller (6), said axle lock having the following construction:

10 - one end of the reeling-off roller (6) has the form of a rectangular shoulder (36) of generally uniform thickness;

15 - in the side member (5) in which the aforesaid end of the reeling-off roller (6) is intended to be inserted, there is provided a side-member axle (44) whose end which faces towards the reeling-off roller (6) is provided with a flange (45) on which a rotatable locking ring (37) is mounted, said locking ring being provided
20 with a recess (38) corresponding to the shoulder (36) and the rotation of which is limited by a stop screw (39);

25 - extending through the locking ring (37) is a journalled blocking pin (40) which is biased by a spring means (41) for movement in a direction towards the centre of the locking ring (37), from an outer position to an inner position, wherein the locking pin (40) is so constructed and so mounted that the pin is moved from
30 its inner position by the spring means (41) only when the shoulder (36) is correctly inserted in the recess (38); and

35 - the axle lock (35) is thereby so constructed that any attempt to rotate the reeling-off cylinder (6) when the locking pin (40) is located in its outer position is

prevented by movement of the locking pin (40) against a stop abutment (42), thereby preventing the pulse-processing means (24) from producing acceptable signals which make impossible continued operation of the apparatus; and in that the apparatus also includes a second axle lock (43) for the reeling-on roller (7), the construction of this second axle lock being similar to the construction of the first axle lock (35).

- 10 16. Apparatus for automatically cleaning a roller in accordance with Claim 15, c h a r a c t e r i z e d in that the flange (45) has a profiled surface section (27); in that the apparatus is provided, preferably on the side members (5), with safety pins (25) having
- 15 springs (26), said safety pins being constructed so that
- their respective springs (26) will strive to move the safety pins (25) towards said profiled surface section (27);
 - with smooth running of the apparatus respective
- 20 springs (26) are activated, with the aid of compressed-air, so as to prevent the safety pin (25) from lying in abutment with the profiled surface section (27);
- when the delivery of compressed-air ceases, according to the above, the spring (26) moves the safety pin (25)
- 25 into engagement with said profiled surface section (27);
- the delivery of compressed-air is effected through an active valve (28) which requires the presence of a continuous input signal in order to remain open;
 - the delivery of compressed-air ceases when said input
- 30 signal no longer exists, in addition to ceasing as a result of disturbances in the delivery of compressed-air as such;
- the input signal is generated by the pulse-processing means (24) when, and only when, the pulse-processing
- 35 means (24) fails to detect serious disturbances in operation of the apparatus.

17. Apparatus for automatically cleaning a roller in accordance with any one of the preceding Claims, characterized in that the side members (5), and optionally the housing (4), are constructed so as to form parts of means connected thereto.

18. Apparatus for automatically cleaning a roller in accordance with any one of the preceding Claims, characterized in that the apparatus includes a cleaning-web degreasing bath (19) which is preferably placed between the pressure pad (11) and the reeling-on roller (7), so that the cleaning web (9) will subsequently pass through said bath (19).

19. A method for automatically cleaning a roller, particularly an impression cylinder (1) fitted with a blanket (2), or a counter-pressure cylinder, with the aid of a cleaning apparatus according to any one of Claims 1-9 and any one of Claims 12-18, characterized by the following steps:

1) spraying the rear side of that part of the cleaning web (9) which extends between the reeling-off roller (6) and the pressure pad (11) with a cleaning agent (13) delivered from the spray device (12), said cleaning agent (13) rapidly penetrating the web (9);

2) urging the holder (14) forwardly from a rearward position with the aid of the piston (15), wherewith part of the web (9) is unreeled from the reeling-off roller (7), this web part having the same length as the length of the working stroke of the piston (15);

3) retracting the piston (15) so as to return the holder (14) to its rearward position and such that during said return movement the rotary cylinder (16)

will rotate the reeling-on roller (7) in an anti-clock-wise direction, therewith to draw the web-part saturated with cleaning agent (13) over the pressure pad (11);

5 4) again urging the holder (14) forwardly from its rearward position, with the aid of the piston (15), such as to press the pressure pad (11) against the blanket (2) while the impression cylinder (1) continues to rotate, wherein the wetted cleaning web (9) wipes-off
10 deposits and paper fibres from the blanket (2), and ensuring, or not ensuring, that the rear side of that part of the web (9) which extends between the reeling-off roller (6) and the pressure pad (11) is sprayed with cleaning agent (13) from the spray device (12) during
15 some part of this cleaning operation;

5) retracting the piston (15) so as to return the holder (14) to its rearward position, wherein the rotary cylinder (16) is activated during this return movement
20 such as to rotate the reeling-on roller (7) anti-clock-wise, wherein fresh, dry cleaning web (9), or cleaning web that has been sprayed with cleaning agent (13) is drawn forwards over the pressure pad (11) while simultaneously drawing the soiled part of the cleaning web (9)
25 away from the pressure pad (11) or subsequent winding onto the reeling-on roller (7); and

6) repeating steps 4) and 5) as often as is required to satisfactorily clean the blanket (2).

30

20. A method for automatically cleaning a roller, particularly an impression cylinder (1) provided with a blanket (2), or a counter-pressure cylinder, according to Claim 19, c h a r a c t e r i z e d in that prior
35 to carrying out step 1) a given length of used, but only slightly soiled, cleaning web (9) is re-wound in a

direction from the reeling-on roller (7) to the reeling-off roller (6).

21. A method for automatically cleaning a roller,
5 particularly an impression cylinder (1) provided with a blanket (2), or a counter-pressure cylinder, in which a cleaning apparatus according to any one of the Claims 1-8 and according to any one of Claims 10-18 is used,
c h a r a c t e r i z e d by the steps of:

10

1) spraying the rear side of that part of the cleaning web (9) which extends from the reeling-off roller (6) and the pressure pad (11) with cleaning agent (13) delivered by the spray device (12), said cleaning agent
15 (13) rapidly penetrating the cleaning web (9);

20

2) rotating the reeling-on roller (7), by means of said second drive means (21), so as to advance the cleaning web (9) over the pressure pad (11);

25

3) urging the holder (14) forwards from its rearward position by means of the piston (15), such that the cleaning web (9) is brought into engagement with the slowly-rotating roller or impression cylinder (1) and
25 therewith remove deposits and fibres from the blanket (2);

30

4) retracting the piston (15), so that the holder (14) returns to its rearward position;

35

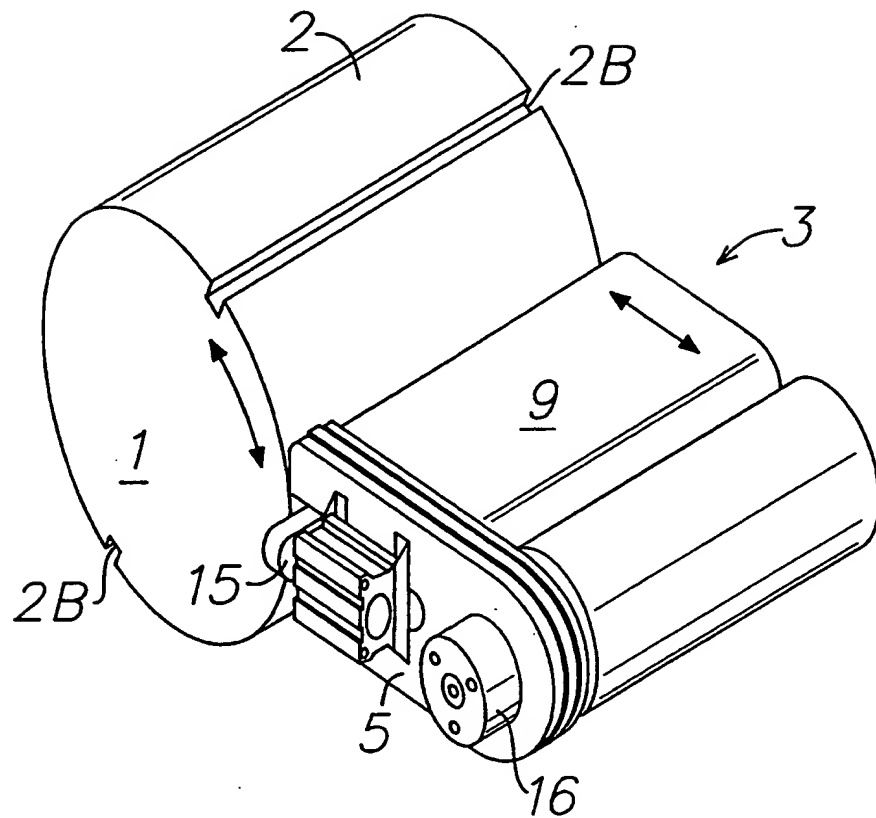
5) when the used part of the cleaning web (9) is heavily soiled, feeding the said web part towards the reeling-on roller (7) with the aid of said second drive means (21), or, conversely, when the used part of the cleaning web (9) is only slightly soiled, feeding said
35 web part towards the reeling-off roller (6) by means of

the first drive means (20), so that this lightly-soiled web-part can be reused; and

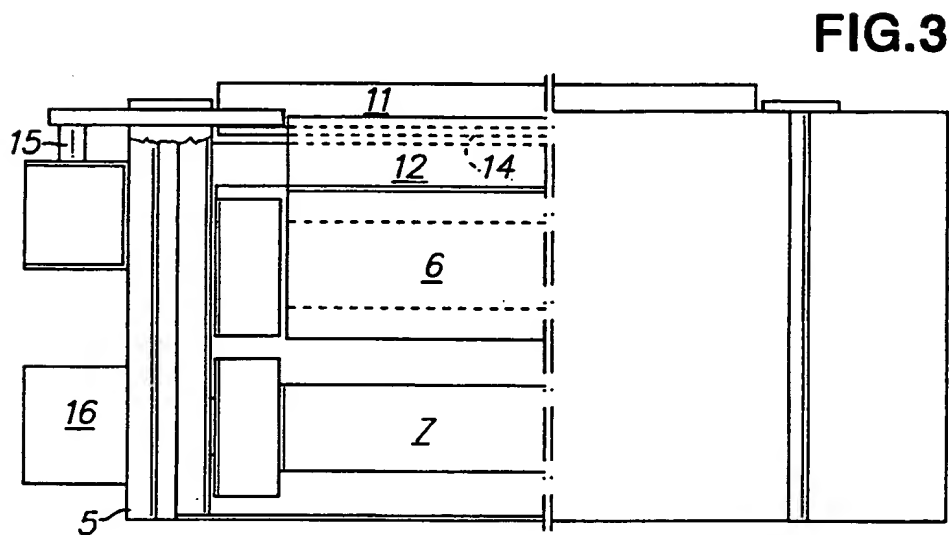
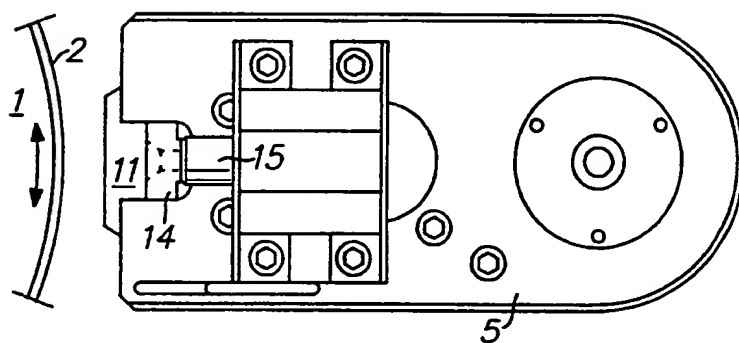
- 5 6) continuing the cleaning process until the blanket (2) is satisfactorily cleaned, either by a moist cleaning process, i.e. repetition of the aforesaid steps 1)-5), or a dry cleaning process, i.e. a repetition of the aforesaid steps 2)-5), or by alternating between a moist cleaning process and a dry cleaning process.

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**FIG.1**

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FIG.4

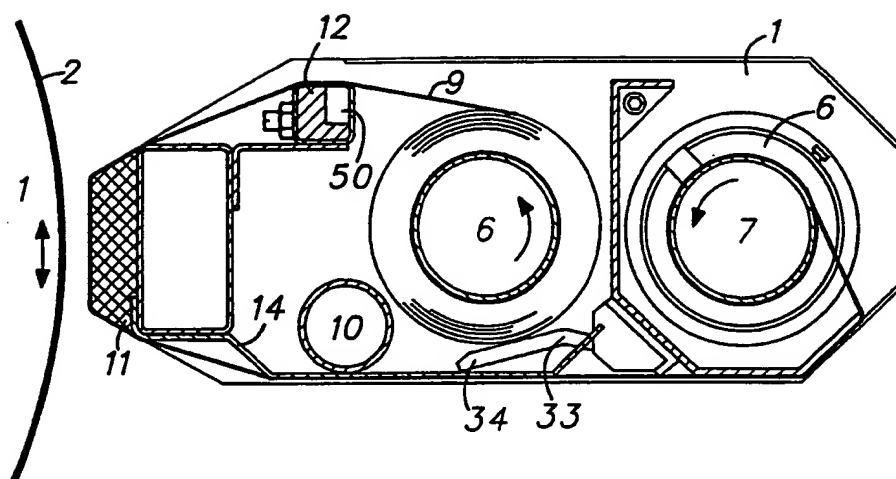
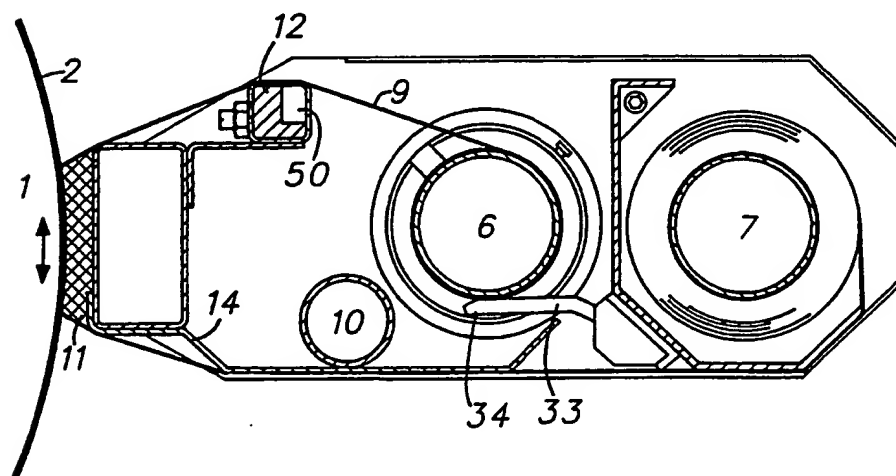


FIG.5



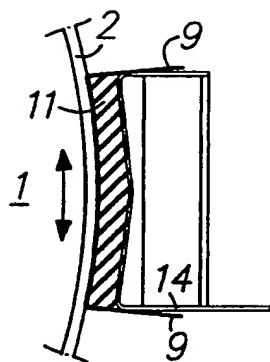


FIG. 6

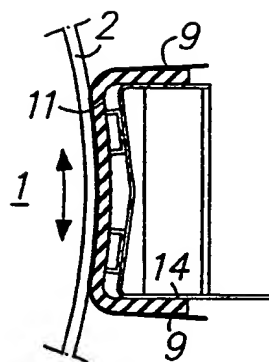


FIG. 7

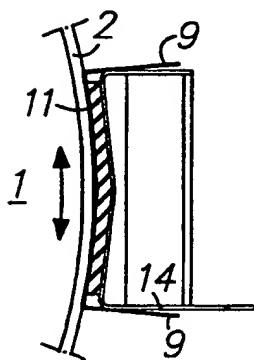


FIG. 8

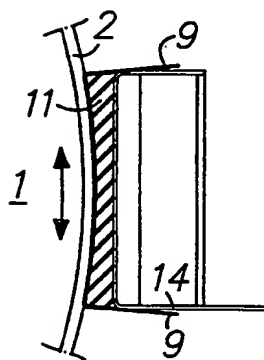


FIG. 9

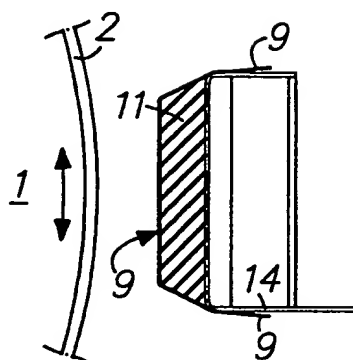


FIG. 10

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FIG.11

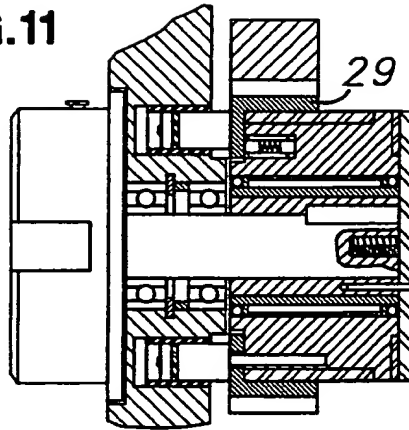


FIG.13

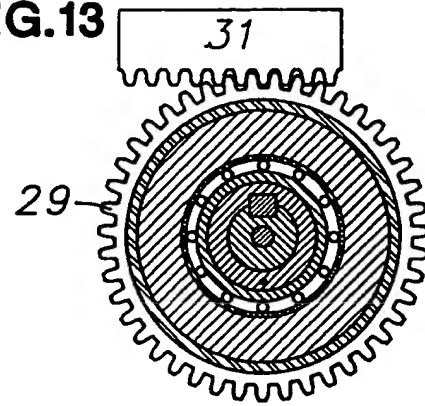


FIG.12

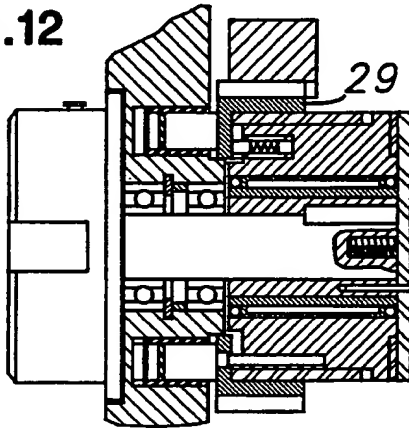


FIG.14

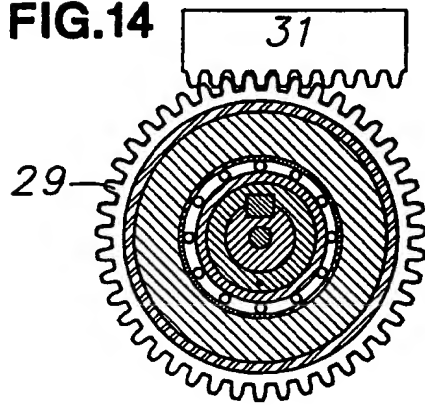
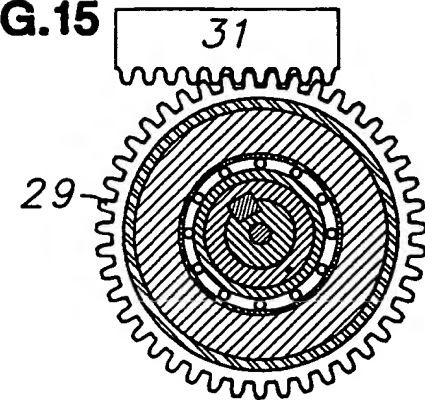


FIG.15



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FIG.16

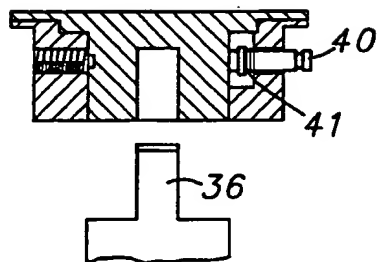


FIG.18

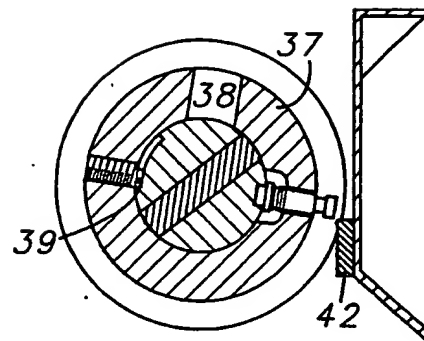


FIG.17

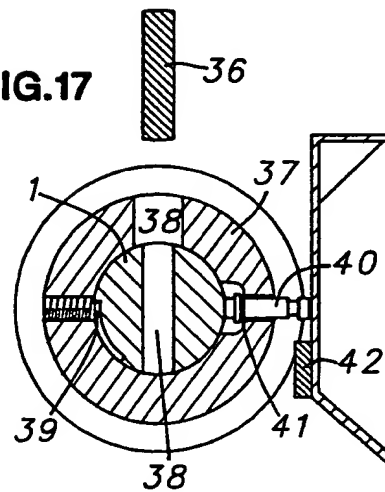
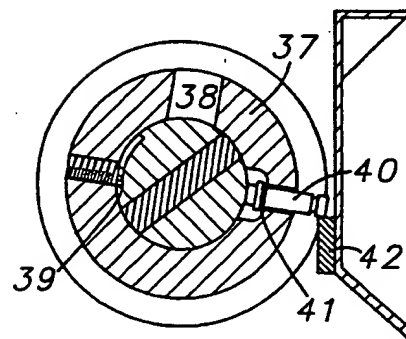


FIG.19



INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 92/00643

A. CLASSIFICATION OF SUBJECT MATTER

IPC5: B41F 35/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC5: B41F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB, A, 2229396 (HEIDELBERGER DRUCKMASCHINEN AKTIENGESSELLSCHAFT), 26 Sept 1990 (26.09.90), figures 2-4, abstract --	1-21
A	US, A, 4981078 (DETTINGER ET AL), 1 January 1991 (01.01.91), column 4, line 8 - line 14, abstract --	1-21
A	US, A, 4920880 (HARA ET AL), 1 May 1990 (01.05.90), figures 1-7, abstract --	1-21

☒ Further documents are listed in the continuation of Box C.☒ See patent family annex.

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

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Date of the actual completion of the international search

Date of mailing of the international search report

22 April 1993

26 -04- 1993

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 92/00643

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X,E	SE, A, 91008326 (BIRGER HANSSON ET AL), 20 Sept 1992 (20.09.92) -----	1-10, 17, 19-21

INTERNATIONAL SEARCH REPORT
Information on patent family members

31/03/93

International application No.

PCT/SE 92/00643

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
GB-A-	2229396	26/09/90	DE-A-	3909119	27/09/90
			US-A-	5105740	21/04/92
US-A-	4981078	01/01/91	DE-U-	8816264	30/03/89
			EP-A,B-	0334173	27/09/89
US-A-	4920880	01/05/90	DE-A-	3868734	09/04/92
			EP-A,B-	0299193	18/01/89
SE-A-	91008326	20/09/92	NONE		